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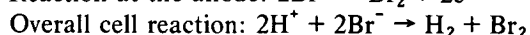
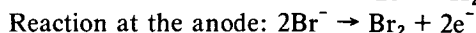
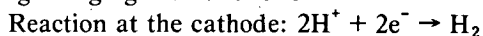


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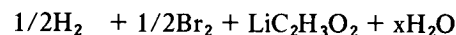
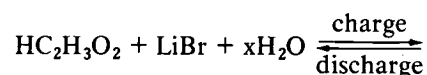
Acid/Alkali Bromide Secondary Battery

A new secondary electrochemical battery has been developed which has high energy/weight density. The battery is rechargeable and works on a reaction between hydrogen and bromine. Hydrogen and bromine ions are selectively electrolyzed to liberate hydrogen at the cathode and bromine in solution at the anode (see illustration). The hydrogen remains stored under pressure.

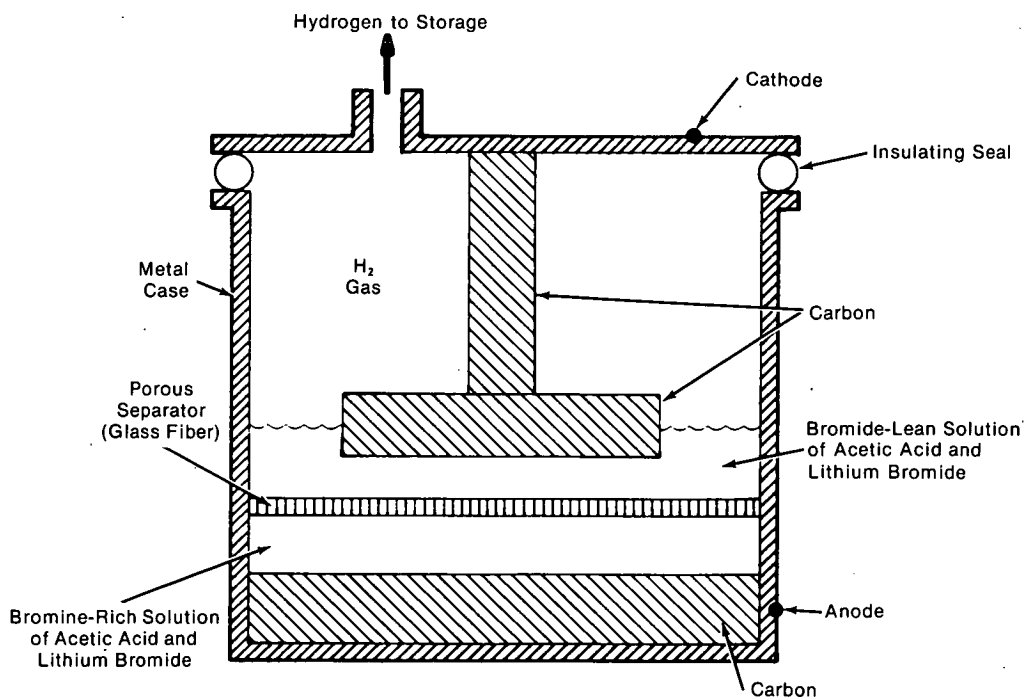
Initially the cell is filled with acetic acid ($\text{HC}_2\text{H}_3\text{O}_2$) and lithium bromide (LiBr) in a solution containing water. Next it is charged. The reactions that occur during charging are as follows:



The overall reaction can be expressed as



for which the theoretical energy density (when $x = \text{zero}$) is approximately 84 watt-hours/lb (187 watt-hours/kg). The choice of acid or bromide salt can be varied, but it is necessary to keep the molecular weight low to keep the energy density high. Using the described configuration, a cell 3 inches (7.6 cm) in diameter yields a short circuit current of 200 mA with an open circuit voltage of 0.75 V.



Acid/Alkali Bromide Battery

(continued overleaf)

Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: TSP75-10324

Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457(f)], to the California Institute of Technology, Pasadena, California 91109.

Source: Cristopher England of
Caltech/JPL
(NPO-13237)